

How to Stabilize the Banking System: Lessons from the London Money Market*

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Abstract: This paper argues that the British financial system in the era prior to World War I provides modern policymakers with a successful model of how to stabilize the banking system. This model had two components: incentives were structured to ensure that all banks that originated or traded assets on the money market sought only to trade in high-quality assets, and macro-prudential regulation promoted the segregation of money markets from capital markets, monitored the growth of money market credit, and restricted trade on the money market in assets issued by entities and sectors whose money market liabilities were growing so fast that the most reasonable explanation was that the money market was being used to finance longer-term investment. These facts indicate that policymakers can successfully stabilize the banking system through a combination of structural reform and regulation of the growth of credit.

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Key words: prime bank bills, commercial bills, real bills, safe assets, macro-prudential regulation, financial stability, discount policy, London money market, central banking, Bank of England

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Recent empirical analysis of long-run cross-country banking data has found that there are two distinct eras of financial capitalism: the first includes the years from 1870 to 1914 when London was the center of the world financial system and is characterized by credit growth that matched GDP growth and by crises with real effects that are relatively small, whereas the second extends from 1945 and is characterized by credit growth that greatly exceeds GDP growth and by crises with real effects that are markedly greater than in the previous era.¹ I argue here that the relative stability of the earlier era was no accident, but instead the product of nascent central banking techniques and thus deliberate policy.² Indeed, a central banker from the era prior to World War I, had he been alive at the turn of the 21st century, would almost certainly have predicted the 2007-08 crisis and its severity. For this reason an understanding of pre-1914 British banking, which can be gained by studying the works of luminaries such as Henry Thornton, W.T.C. King, and R.S. Sayers, provides us with very clear recommendations for what should be done to stabilize the banking system.

At the heart of pre-1914 British banking laid the London money market, which was structured to align incentives at both a micro- and a macro-economic level. Because incentives were well aligned every money market participant sought to originate and to trade only assets that would not go into default. This, however, was not sufficient to promote financial stability. Equally important were the backstop of the

¹ Moritz Schularick & Alan M. Taylor, *Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870–2008* at 3, 16 (NBER Working Paper No. 15512, Nov. 2009). In this discussion of the two eras I exclude the interwar years as a transition period between the first era in which the world financial system centered on London and the second where it centered on New York. This result is distinguished from Raymond Goldsmith's thesis that financial intermediation grows faster than GDP by the fact that Schularick and Taylor's data focuses specifically on banks and bank lending.

² As Sayers explains "it was in the business of the discount office that central banking was already recognizably in operation before 1914 ... It was, too, a part of the Bank in which the Governors themselves ... were regularly active. ... it was primarily through this channel that the Bank exercised that control over the quality of credit which it regarded as one of its essential duties." Sayers (1976) at 272-73. The duty of supporting the system of commercial credit by discounting good commercial paper was acknowledged by the Bank as early as 1810. After discussing an increase in the quantity of discounts and considering a motion to restrict them, the Court of Directors notes: "That this Corporation being particularly interested in the Prosperity of the Commerce of the Country, is peculiarly called upon to give every possible assistance and support to the Commerce and Credit of the City of London." and then rejected the motion. Bank of England, Minutes of the Court of Directors 219 (1809-1811). See also John Clapham, *The Bank of England: A History* v. 2 at 15 (1945); Ian Duffy, *The Discount Policy of the Bank of England during the Suspension of Cash Payments, 1797-1821*, 35 Econ. Hist. Rev. 67, 76 (1982).

central bank and the macro-prudential principles enforced by the central bank, which, first, treated unusual credit flows on the money market with skepticism, monitoring the market to ensure that such credit growth was repressed promptly, particularly if there was evidence that the credit flows were being used to finance long-term business activities, and, second, disapproved of the use of money market instruments to finance long-term assets more generally.³ Thus, in Britain financial stability, the origination of privately issued assets that had very low risk of default, constraints on credit growth, and the segregation of money from capital markets were all closely related phenomena. This paper argues that an understanding of how these elements interacted and sustained each other in pre-1914 Britain can help modern policy-makers in their efforts to promote financial stability.

The relevance of the data cited above to this argument is premised on the view that credit policies pursued in the most important international money market can affect credit growth far beyond the borders of the dominant economy.⁴ Thus, prior to 1914 the behavior of credit in many of Britain's trading partners could be affected by the rules of the London money market.⁵ By contrast, after 1945 as New York quickly became the dominant money market, London policy lost much of its influence abroad and became relevant mostly to the domestic market. In short, even though the London money market continued to operate on the basis of the same principles well beyond 1914, by the middle of the 20th century London's policies played a much reduced role in conditioning the growth of bank credit worldwide. Because the United States developed its own approach to stabilizing credit markets, some of the fundamental principles of British banking were forgotten.

³ Here, the term "macro-prudential" regulation refers to money market policies that are designed to affect many firms simultaneously and thus have an effect on the market as whole, e.g. a policy that a certain sector's finance bills should no longer circulate on the money market. It can be distinguished from micro-prudential regulation, which limits the behavior of an individual firm, e.g. a request made to a specific firm to reduce its acceptance business.

⁴ Support for this view in modern data is found in Hélène Rey, *Dilemma not Trilemma: The global Financial Cycle and Monetary Policy Independence* (NBER Working Paper No. 21162, May 2015).

⁵ An example is the Bank of England's decision in 1906 to discourage the circulation of American finance paper in the London money market due to concerns about the quality of the paper. When such actions were taken in London, the effects on foreign economies could be dramatic, for example, by aggravating the panic of 1907.

Notably, two concepts basic to the pre-1914 British understanding of financial markets have been rediscovered by modern theorists since the 2007-08 crisis: money market stability is founded on “safe” assets,⁶ not the price discovery that characterizes capital markets; and the feedback loops that are created by money market finance of capital market assets foster asset price instability. Early 20th century financial markets in Britain were segregated precisely in order to combine stable money markets with price discovery – but not price instability – on capital markets. In fact, the stability of the London money market – and the British banking system – during this period is widely recognized,⁷ as is the dominant role played by the London Stock Exchange in world capital markets at the time.

Note that the term stability as it is used in this paper does not refer to a complete absence of panic or of bank failure, but instead to an environment where those crises that take place have relatively moderate effects both on the real economy and the banking system, as is consistent with the data cited above for the pre-1914 period. Thus the question of “how to stabilize the banking system” is one of how to eliminate the danger of financial collapse or of crises that exhibit increasing severity over time, not a question of how to protect the economy from experiencing any adverse events at all.

This paper analyzes the different components of the institutional structure of the pre-1914 London money market, and how they contributed to the success of the money market. Because the focus is on institutional structure and the goal is to answer the question of what elements comprise a “good” financial structure, the underlying framework draws from game theory more than from competition theory. Thus, it is far from clear that there will be a tradeoff between stability and efficiency in the analysis. After all, if a

⁶ Note that in this paper the term “safe asset” does not refer to a risk-free asset or to safety in absolute terms, but instead to an asset that bears risk that is sufficiently small that it can serve as a liquid money market instrument. See Mark Carlson, Burcu Duygan-Bump, Fabio Natalucci, William R. Nelson, Marcelo Ochoa, Jeremy Stein, and Skander Van den Heuvel, *The Demand for Short-Term, Safe Assets and Financial Stability* 2 (Federal Reserve Board Finance and Economics Discussion Series Working Paper No. 2014-102, Nov. 2014) (equating “safety” with “moneyness”).

⁷ See, e.g., Nicholas Dimsdale & Anthony Hotson, *Introduction*, in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 1,7 (2014); Charles Calomiris, *Banking Crises Yesterday and Today*, 17 *Fin. Hist. Rev.* 3, 9 (2010). At least one scholar argues that the period of stability lasted much more than one century: John Turner, *Banking in Crisis* 8 (2014).

country has a financial structure that is performing well below its potential because, for example, incentives are misaligned and fraud is common, it is reasonable to expect that improving this structure in a way that will greatly reduce fraud may promote both stability and efficiency at the same time. Even so, the macro-prudential, “real bills”-based components of British banking have been framed as promoting either efficiency, e.g. Sargent (2011), or stability, e.g. Capie (1995), at the expense of the other, and it is important to acknowledge that there are arguments on both sides.⁸ In no small part because there is so little consensus on the relationships between real bills, efficiency and stability, however, this paper takes no position on the tradeoff or indeed on the question of whether there is a tradeoff at all.

This paper brings together a number of arguments made by other authors who have explored the foundations of the London money market’s remarkable stability and argues that it was the combination of structural and prudential regulatory features that made it possible for privately issued assets to be safe and liquid. Benefits of the “real bills” approach to banking have been explained by several authors. Charles Goodhart (2011) discusses real bills as a form of macro-prudential regulation that promoted stability in part by constraining the growth of credit to match that of GDP.⁹ Allen (2014) advocates a macro-prudential “eligibility policy” that allows banks to treat certain forms of short-term commercial debt as high quality liquid assets.¹⁰ Flandreau and Ugolini (2013) discuss the micro-prudential regulatory role played by Bank of England in monitoring the bills that traded on the money market and argue that this helped establish the international status of sterling,¹¹ Avner Offer (2014) and Goodhart and Perotti (2015)

⁸ Thomas Sargent, *Where to Draw Lines: Stability vs. Efficiency*, 78 *Economica* 197, 201-02 (2011). The argument that real bills based short-term finance was inefficient and “failed” British industry is founded on a model of fixed-capital-driven industrial growth. Capie concludes that in the pre-1914 period the evidence does not support the view that the British banking system was inefficient. Forrest Capie, *Prudent and Stable (But Inefficient?): Commercial Banks in Britain, 1890-1940* in Michael Bordo and Richard Sylla ed. *Anglo-American Financial Systems* 41, 61 (1995).

⁹ C.A.E. Goodhart, *The Changing Role of Central Banks*, 18 *Financial History Review* 135, 137 (2011).

¹⁰ William Allen, *Eligibility, Bank Liquidity, Basel 3, Bank Credit and Macro-Prudential Policy* 8, 10 (SSRN working paper, Sept. 2014)

¹¹ Marc Flandreau and Stefano Ugolini, *Where It All Began: Lending of Last Resort and Bank of England Monitoring during the Overend-Gurney Panic of 1866*, in Michael Bordo and William Roberds ed. *A Return to Jekyll Island: The Origins, History, and Future of the Federal Reserve* 113, 116, 118 (2013).

argue that the real bills approach involved functional specialization of the different parts of the financial system and by separating the money supply from real estate finance promoted financial stability.¹² This paper acknowledges the importance of these aspects of “real bills,” but also explains the stability implications of the “real bills” based segregation of capital markets – rather than just real estate – from money markets, details how “real bills” functioned to constrain the growth of credit, and argues that stability also required a market structure that aligned incentives on the money market.

Few modern authors have focused on the structural aspects of early 20th century British banking. Only Turner (2014) argues that the extended liability faced by bank owners (and manager-owners) played an important role in stabilizing the banking system.¹³ This paper goes beyond Turner’s argument by emphasizing the important role in aligning incentives that was played by three additional structural factors: the market was structured as a discount market, with closely interconnected banks, and the banking system itself was required to bear the losses even of a “too-big-to-fail” bank.

The first part of this article sets forth the basic characteristics of the London money market in the early 20th century and the principles that governed the behavior both of the banks that traded on it and of the central bank that backstopped it. The second part focuses on the relationship between these principles and recent theory explaining the 2007-08 crisis. The third derives lessons that can guide policy makers in their efforts to stabilize the modern banking system.

The London money market in the pre-1914 period

How was it possible for the privately issued assets that traded on the London money market to be “safe” assets? This section explains that it was possible due to a combination of carefully aligned incentives that ensured that it was in no bank’s interest to originate or trade on the money market an asset that was likely

¹² Ayner Offer, *Narrow Banking, Real Estate, and Financial Stability in the UK c. 1870-2010* in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 158, 159-60 (2014); Charles Goodhart & Enrico Perotti, *Maturity Mismatch Stretching: Banking has Taken a Wrong Turn*, CEPR Policy Insight No. 81 at 1, Mar. 2015.

¹³ John Turner, *Banking in Crisis* 10 (2014).

to default and prudential regulation based on “real bills” principles that deliberately discriminated against certain types of short-term financing.

Three important structural characteristics of the London money market differentiate it from modern money markets. First, even though many banks were structured as limited liability companies, in the event that a limited liability bank failed without enough assets to cover its obligations shareholders were still liable for an additional capital contribution that amounted to 20% or more of the value of deposits in the bank.¹⁴ In addition, since the directors of a bank were typically required by the articles forming the bank to hold shares in it, in Britain a portion of a bank manager’s wealth was at stake in the event that the bank failed.¹⁵ This system of extended liability aligned the interests of bank owners with those of bank creditors, and the fact that managers were exposed to the losses of a failed bank aligned the interests of the managers with those of the owners.

Second, the London money market in the early years of the 20th century was a discount market. In a discount market, every seller of an asset endorses it, guaranteeing that the asset will pay in full. Thus, for accounting purposes, once one has purchased an asset on a discount market, exposure to the credit risk of that asset cannot be eliminated by sale, but is only eliminated when the asset is paid off. This structure ensured that the interests of the banks that originated and traded money market assets were always aligned with those of the holder of the asset when it matured.

Third, the safe assets that traded on the London money market were privately issued, prime bank bills.

Thus, even though then as now money market stability required that the assets traded on the market be

¹⁴ John Turner, *Holding Shareholders to Account: British Banking Stability and Contingent Capital*, in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 139, 145 (2014). Note that one segment of the banking sector, the acceptance houses were typically structured as unlimited liability partnerships – clearly this structure was also effective in aligning the interests of these banks and their managers with those of their creditors. It is also important to observe that the Bank of England, Bank of Ireland, Bank of Scotland, and Royal Bank of Scotland were limited liability corporations in the modern sense of the word and shareholders in these four note-issuing banks faced no risk of a contingent capital call.

¹⁵ *Id.* at 145-46.

safe, facing almost no price risk, in Britain privately issued debt dominated the market, and Treasury bills played only a trivial role in it.¹⁶

Given that in modern discourse the term “safe asset” usually refers to government debt, it is important to understand what made it possible for privately-issued prime bank bills to comprise the safe assets of the London money market. The most important characteristic of a prime bank bill is that it is the liability of more than one entity. Overlapping guarantees did not only ensure that the failure of a single firm could not result in money market losses, they also mitigated – or even eliminated – incentive problems. Indeed, the liquidity of the London money market was closely tied to its structure as a discount market and to the resulting alignment of incentives which ensured that it was in no market participant’s interest to circulate debt of uncertain quality on the market.¹⁷ The fact that bank managers’ personal assets were at risk also mitigated incentive problems and fostered a liquid market.

Alignment of incentives alone, however, is not sufficient to stabilize a money market: it is a well-recognized problem that price competition between banks can erode underwriting standards – as banks that are poorly (or fraudulently) managed and undercharge for the risk that they are taking on capture

¹⁶ Richard Roberts, *The Bank of England and the City* in Richard Roberts & David Kynaston ed. *The Bank of England: Money, Power, and Influence 1694 – 1994* at 152, 155 (1995).

¹⁷ An open market structure which dispenses with the seller’s guarantee of each asset sold is closely associated with moribund secondary trading – and therefore limited liquidity – in the money market. The U.S. commercial paper market (both in the early 20th century and at present) is an example of an open market in a money market instrument where trading in secondary markets does not take place. John James, *The Rise and Fall of the Commercial Paper Market, 1920-1929*, in Michael Bordo & Richard Sylla ed. *Anglo-American Financial Systems* 219, 224 (1995). It is true that interconnectedness can also function as a transmission mechanism of shocks, as occurred in 1931, when capital controls were imposed abroad to the detriment of the acceptance banks that had guaranteed foreign bills. See Olivier Accominotti, *London Merchant Banks, the Central European Panic, and the Sterling Crisis of 1931*, 72 J. Econ. Hist. 1, 5 (2012). Because the Bank of England monitored the discount market assiduously, it was able to isolate and address the problem by participating in international “Standstill Agreements” – the first of which was signed just one month after the implementation of capital controls – and by creating an exception for the “frozen bills” that allowed them to be discounted at the Bank. *Id.* at 2, 31; R.S. Sayer (1976) at 506. (Note that Accominotti places the date of the first Agreement a month later. At 6.) These interventions ensured that the only banks that were adversely affected by the shocks were the acceptance banks, and even they suffered few if any long-term consequences. See Accominotti 1- 36; Nicholas Dimsdale & Nicholas Horsewood, *The Financial Crisis of 1931 and the Impact of the Great Depression on the British Economy*, in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 116, 119-20 (2014), R.S. Sayer (1976) at 503-12. Overall the 1931 “crisis” is evidence of how effective a central bank that assiduously monitors the flow of credit can be in protecting an interconnected money market.

market share from those banks whose business model is viable over the long run.¹⁸ In short, while the alignment of incentives does much to eliminate fraud, it is less effective at eliminating errors due to overconfidence as in the short run this type of error often results in an increase in market share. Thus, an important question for the structure of any banking system is how it mitigates the adverse effects of competition by either preventing the growth of banks with a short-run business model or ensuring that they fail quickly – before the banking system itself is destabilized.

In Britain central bank policy protected the money market from destabilizing competition. This was possible because an asset had to be eligible for discount at the Bank of England in order for it to trade on the money market. As a result, the Bank's discount policy was the key determinant of the liquidity of a money market instrument, and this gave the Bank effective control over the money market.¹⁹ By 1900 the Bank's control was so complete that even “when the Bank's grip was light, the banks ... watched closely the trend of official policy, anxiously scanning ... for any clue as to what the [next] action of Threadneedle Street would be.”²⁰

Discount policy was designed to “maintain the standards of quality long associated with the London prime bank bill and hence its reputation as a liquid asset of undoubted security.”²¹ Two policy rules in particular supported this goal. First, only “two-name paper,” or debt that bore the guarantee of two

¹⁸ See Charles Goodhart, *Evolution of Central Banks* 48 (1988). George Akerlof and Paul Romer develop a formal model of this phenomenon in which bank fraud results in “widespread bankruptcy after the collapse, even for banks and developers who were not party to looting.” *Looting: The Economic Underworld of Bankruptcy for Profit*, Brookings Papers on Economic Activity 2 at 1, 41 (1993).

¹⁹ King, 320-21. Indeed, as early as 1772 this role of the Bank was clearly expressed by an anonymous author: “You will find that the only cause of such bills as are good at bottom being refused by private bankers in London, is because the Bank of England will not discount them, and on that account such bankers cannot turn them into cash till due, be their necessity ever so great. For this and other obvious reasons, you will find it impossible to carry on your business as a banking company independent of the Bank of England, that being the great source of the British funds, and credit without whose countenance and occasional aid, no banker, nor merchant even in London can do business with safety and profit.” *London Chronicle*, 15-17 Sept. 1772 at 269.

²⁰ King, 320.

²¹ Bank of England, *Commercial Bills*, Bank of England Q. Bull. 2(4) at 26, 28 (1961), quoted in Nicholas Dimsdale & Anthony Hotson, *Financial Crises and Economic Activity in the U.K. since 1825* in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 24, 47 (2014). See also R.S. Sayers, *The Bank of England 1891-1944* at 33-34 (1976).

“good” names, was eligible for discount.²² Thus, a London bank that originated a loan to a small tradesman could not discount that paper at the Bank. In order for the asset to be a money market asset the bank had to add its own guarantee, called an acceptance, to the loan, at which point any other bank that qualified as a “good name” could discount the paper at the Bank. In short, interconnectedness was imposed on the banks by the structure of the market.

Second, the Bank of England had a policy of monitoring the list of “good names” by carefully tracking its exposure to each name, not only directly at the discount window, but also indirectly in the form of acceptances or endorsements.²³ In much the same way that a private banker would monitor a client’s use of credit and begin to restrict that credit if there were signs that the client was rolling bills over excessively and that his business was not generating the funds needed to keep his debt from growing quickly, when the Bank of England’s exposure to a particular name grew notably or if it had concerns about the changing quality of a name’s liabilities, the Bank would take action.²⁴ The Bank had many tools at its disposal: it could simply communicate with the client, it could communicate with other market participants either directly or indirectly by charging higher rates on paper bearing the name, or it could refuse the paper at the discount office.²⁵ As was noted above the banks trading on the London money market were extremely responsive to any hints given by the Bank with respect to discount policy. For this reason the market was often anthropomorphized and described as “refusing to discount bills” when, for example, an originating bank had placed so much paper on the market that it “aroused suspicion.”²⁶ In any individual case it is often difficult to determine whether the money market itself – acting one assumes

²² R.S. Sayers, *The Bank of England 1891-1944* at 35 (1976).

²³ Marc Flandreau & Stefano Ugolini, *The Crisis of 1866*, in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 76, 86 (2014). For this reason the Bank was alerted to Baring’s situation months before the crisis in November 1890. *Id.* at 87.

²⁴ R.S. Sayers, *The Bank of England 1891-1944* at 273 (1976).

²⁵ *Id.* See also Sayers description of the evolution of discount policy after World War I when the Bank started purchasing representative parcels to sample the market: “The Bank would occasionally comment on, or even throw out, particular items in a parcel; the Bank’s reaction to any novel business would thus become known in the market.” *Id.* at 279.

²⁶ See, e.g., Ira Cross, *Domestic and Foreign Exchange: Theory and Practice* 218 (1932) or the case of the City of Glasgow Bank discussed in note 34.

through the discount houses that functioned as gatekeeper banks – restricted credit or whether this took place at the instigation of the central bank, and only in a few instances do we have clear evidence of the Bank of England's role. On the other hand, King and Sayers, the scholars most familiar with the operations of the discount market, both concluded that the Bank exercised "control" over the market.²⁷ The details of the role played by the central bank are, however, much less important than the fact that the Bank of England was universally understood to govern a money market that was widely recognized for its ability to act promptly to repress credit growth that went beyond the norms considered acceptable.²⁸

By most accounts, the Bank of England had only to hint its disapproval of a bank's activities in order for the bank to change its behavior. The force of such admonitions was surely strengthened by the consequences that had been suffered by bankers whom the Bank deemed to have abused the resources available on the London money market: all were aware that the Bank's decision not to support Overend, Gurney and Co. in 1866 was the proximate cause of that bank's failure and that the limited support provided to Baring Brothers and Co. in 1890 was carefully designed to leave the owners of Barings with

²⁷ Sayers (1976) at 273, 275; King at 321.

²⁸ See, e.g. Ira Cross, *Domestic and Foreign Exchange: Theory and Practice* 218 (1932) ("The market has an uncanny way of keeping in touch with the amount of such bills that are offered for discount and, when once its suspicion has been aroused, it has no hesitancy in refusing to discount those bills that have been accepted by a London firm which it feels has "accepted" to too great an extent. Hints may be dropped that "so and so's" bills are too numerous, or a more unfavorable rate of discount may be asked when they are offered for sale, or the market may refuse absolutely to discount them, or some other action may be taken to show that the market feels that the accepting firm has exceeded its limit. Very seldom has this practice of issuing loan or finance bills been abused. Bankers and acceptance houses appreciate the fact that they must not arouse the suspicion of the market if they desire to retain their credit standing with it.")

their liabilities.²⁹ Partners in both of these firms were reduced to poverty, losing their possessions and their status in society.³⁰

While the Bank of England's handling of the two failures was very different, in both cases the Bank established an incentive structure that would induce the banks to monitor each other's behavior. The failure of Overend implied that, if there was any significant risk that a bank would lose its status as a "good name," it was not in the interests of the other banks to be exposed to the suspect bank's liabilities.³¹ In the case of the Baring Brothers, by contrast, certain of the partners were permitted to become directors of a new company, Baring Brothers & Co. Ltd., and to take over the sound mercantile business of the old company including its discounts and acceptances, protecting the value of these assets on the money market; this was only possible, however, because the Bank had persuaded the banks that were the most important of the old company's creditors to put up a guarantee fund that allowed the old company to

²⁹ While it is true that Baring Brothers' mercantile business was saved, it was saved by a "good bank, bad bank" structure. The Bank forced the company to reconstitute the mercantile business as Baring Bros. & Co. Ltd., forced out Lord Revelstoke, the partner who was most accountable for the failure, brought back a retired managing partner (Thomas Charles Baring, "Charley", who was also M.P. for the City of London) who personally guaranteed the new firm, and left the partners of the original firm holding the liabilities of the bad bank (although three of them were permitted to continue as directors, but not owners, of the new bank). See W.T.C. King, *History of the London Discount Market* 308 (1972); "The Reconstruction of Barings," *Economist*, Nov. 29, 1890 at 1507; *Economist*, Nov. 22, 1890 at 1482; "The Baring Crisis," *Bankers' Magazine*, Dec. 1890, 1933-38; Philip Ziegler, *The Sixth Great Power* 255-57 (1988).

Another example of the Bank's power is the House of Vagliano. This Greek bank sued the Bank of England over its discount policies and subsequently lost its status as a "good name" and exited the banking business. Marc Flandreau & Stefano Ugolini, *The Crisis of 1866*, in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 76, 89 n. 11 (2014); Gelina Harlaftis, *From Diaspora Traders to Shipping Tycoons: The Vagliano Bros*, 81 *Business History Review* 237, 259-60 (2007).

³⁰ When it failed Baring Brothers & Co. had seven partners: Lord Revelstoke, who led the firm, John Baring, his son, Henry Mildmay, James S. Hodgson, Francis Baring, Robert Hodgson, and Archibald Norman. Ziegler details the fortunes of Revelstoke, Mildmay and J.S. Hodgson, and the fact that the pensions provided by the firm to retirees were cut except in the case of extreme hardship. Philip Ziegler, *The Sixth Great Power* 260-62 (1988).

³¹ Note that, in general, the presence of a disfavored name as guarantor was enough for the Bank to reject the paper. That is, the guarantee of a third bank would not, in normal circumstances, cure the defect of a "bad" guarantor. See Select Committee on the Bank Acts, Report, 1858, H.C. QQ 226-30 at 16 (U.K.) (Testimony of Sheffield Neave, Governor, and Bonamy Dobree, Deputy Governor) (stating that if any party to a bill fails the discount is required to buy the bill back from the Bank, clearly indicating that two "good" names do not cure the defect of a bad name).

liquidate its assets slowly.³² In short, the Baring Crisis put the banks on notice that even in the event that a “too-big-to-fail” bank failed, they were the parties most exposed to the losses.³³

Overall, the Bank of England’s discount market policies created a strong incentive for London banks to police each other’s origination practices, and to refuse to buy the acceptances of a bank that was lowering the quality of money market assets.³⁴ At the same time these policies strengthened the leadership role of the Bank of England in the market, and by the early years of the 20th century the Bank’s ability to exercise control over the behavior of London banks was so great that there was a common saying that the Governor of the Bank of England had only to raise an eyebrow for a bank to fall in line.³⁵

³² “The Liquidation of the Barings,” *Economist*, Nov. 22, 1890 at 1465-66; Clapham, v II, pp. 333-34.

³³ The Bank of England’s share of the guarantee fund was less than 6%. Clapham, v II, pp. 333-34. As for the government it is true that, when the Bank explained that its public duties conflicted with its business judgment that it should stop discounting Baring’s bills, the government agreed to bear half of any losses due to Baring’s bills discounted at the Bank on one day during which the Bank orchestrated the guarantee fund. Clapham at 332. While this did represent a significant concession on the part of the government, in terms of financial risk borne by the government it was trivial.

Furthermore, while many describe the guarantee fund as a “bailout” of Baring Bros. (e.g. Turner, *Banking in Crisis* 157 (2014)), this analysis is hard to sustain. The parties who had most to lose from a quick liquidation of Barings (which would certainly have realized just a fraction of the value actually realized on its assets) bore the cost of making it possible for Barings to liquidate slowly. It is true that the Barings were only forced into poverty and were able to avoid declaring bankruptcy, but it is extremely unlikely that they were the greatest beneficiaries of the “bailout,” since they wouldn’t have been the only bankrupts. It was the City that was in trouble, it was the City that bore the costs of the guarantee fund, and it was the City that reaped the benefits of the fund. The fund should therefore be viewed as a Coasian outcome, and the Bank of England’s role in the fund is best viewed as a means of reducing transaction costs. Indeed, the value of interconnectedness in the banking system is precisely that it incentivizes such Coasian coordination.

³⁴ Another example of the discipline imposed by this structure is the City of Glasgow Bank (CGB). It failed in 1878 and Kerr explained the process: first, “the London money market had begun to feel that it had absorbed a sufficiency of City Bank paper. Unable longer to retire maturing bills with new paper, the bank had the greatest difficulty taking them up. [Then] ... the Bank of Scotland ... urged the Bank to retire a large amount of their acceptances [that is, CGB acceptances held by the Bank of Scotland],” which forced the CGB to turn for assistance to the other Scottish banks. These banks were only willing to offer support subsequent to an audit. When the audit revealed excessive exposure to a few borrowers, the bank failed. Andrew Kerr, *History of Banking in Scotland* 293-94 (1908). See also Richard Button, Samuel Knott, Conor Macmanus and Matthew Willison, *Desperate adventurers and men of straw: the failure of City of Glasgow Bank and its enduring impact on the UK banking system*, *Bank of England Quarterly Rev.* 23, 24 (2015 Q1).

³⁵ Marc Flandreau & Stefano Ugolini, *The Crisis of 1866*, in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 76, 89 (2014) (“There was, of course, much more to the raised eyebrow than the inconvenience of a stern look. There was detailed information held by the Bank, and there was the Bank’s power to act by denying discount facilities. For those needing a reminder, the corpse of Overends could be shown.”). See also R.S. Sayers, *The Bank of England 1891-1944* at 273 (1976). Note that Flandreau and Ugolini have a somewhat different interpretation of the 1866 crisis in an earlier paper than in the 2014 paper. In the earlier paper they argue that due to the severity of the crisis subsequent to Overend’s failure, the “Bank of England was forced to concede

The Bank's authority extended to the exclusion of suspect categories of assets from the money market.³⁶

For example, in 1906 U.S. finance bills were not paid off when the remittances from the fall harvest flowed in and this raised concerns in London that the London market was being used to finance longer-term U.S. investment.³⁷ The Bank believed that such debt was too risky for the money market, and indicated as much to the London banks by adjusting its discount policy.³⁸ The paper was allowed to run off, and the U.S. had to weather the 1907 crisis without the ability to raise money in London using finance bills. Presumably, the reason that the London banks were so responsive to the Bank of England's concerns was that a bank's decision to support the market for U.S. finance paper by accepting it would have raised questions in the market about the bank's own status as a "good name."

Note in particular that when the Bank of England wished to discriminate against disfavored bills, it did not need to reject the bills outright at the Discount Office. It could instead impose terms on the transactions that were less favorable than those offered for "prime bills" due to the quality of the bills presented. Indeed, the Bank insisted on its right – if not its duty – to evaluate every transaction presented at the Discount Office individually.³⁹ Thus, by the turn of the 20th century the quality controls exercised through discount policy could be implemented incrementally and crisis-provoking shocks could be avoided.

support" to discount houses that it had initially insisted on not supporting. Flandreau and Ugolini (2013) at 115. This is, however, as the quote from the 2014 paper above indicates, just one of many possible interpretations of the 1866 crisis. The Bank arguably never "insisted" on not supporting the discount houses, but had instead announced a policy of supporting them in "special and urgent circumstances" (as opposed to on an ordinary basis). Marc Flandreau & Stefano Ugolini, *Where it all began: lending of last resort and the Bank of England during the Overend-Gurney panic of 1866*, Norges Bank Working Paper 2011-3 at 11 n.31 (2011). It is easy enough to interpret the support of the remaining discount houses in 1866 as precisely the type of "special and urgent" basis that the Bank had allowed for in its initial policy. Indeed, the 1858 policy was viewed at the time as directed specifically against Overend. Flandreau and Ugolini (2014) at 80.

³⁶ R.S. Sayers, *The Bank of England 1891-1944* at 275-77 (1976).

³⁷ Barry Eichengreen, *Golden Fetters* 50-51 (1992). See also W.T.C. King at 316.

³⁸ Sayers (1976) at 44-45, 55.

³⁹ Sayers (1976) at 36-37, 273. On a rare occasion when a discount house questioned the terms offered by the Bank, the Governor himself responded: "although traditionally the Bank must afford accommodation to recognised bill-brokers on approved security, the *form* of accommodation and *rate* are matters to be settled on each occasion." *Id.* at 275 (emphasis introduced by the Principal of the Discount Office who transcribed the quote).

While this explains the structure of the London money market and the central bank's role in it, what remains to discuss are the principles that governed the circulation of assets on the money market. I argue here that the Bank of England – and through it the London money market – was guided by a real bills principle, which favored real bills without imposing the stringent criteria of the “real bills doctrine.” A real bill is a short-term, negotiable debt that originates in a commercial transaction, whereas its counterpart, a finance bill, is a short-term negotiable debt that does not.⁴⁰

According to the “real bills doctrine” as long as the only bills that trade on the money market are real bills, the money supply and real output will necessarily grow together and both inflation and financial instability will be avoided – thus, in a “real bills” world quantitative controls on the money supply are neither needed nor desirable.⁴¹ This statement of the real bills doctrine is, however, also known as the real bills fallacy, because it is demonstrably false: in the absence of a price anchor nothing prevents the money supply and prices from growing together procyclically.⁴²

This “critique” was, however, understood from the time the doctrine was first expressed, and most proponents of real bills either explicitly or implicitly assumed that the gold standard would serve to

⁴⁰ Note that this is the British definition of a “real bill.” The focus on “commercial transactions” in the British definition limits real bills to those bills that have been earned (in accounting terms) by the seller of goods or services, while the fact that the debt is still outstanding indicates that it has not yet been realized (again in accounting terms). Thus, the British definition restricts a real bill to an asset that in the account books of one of the parties is an earned-but-not-yet-realized asset. Whenever a bank chooses to roll over an existing real bill, the new bill will no longer have originated in a commercial transaction, and it will be a finance bill. Sayers (1976) at 277; William Allen, *Eligibility, Bank Liquidity, Basel 3, Bank Credit and Macro-Prudential Policy* 19 (SSRN working paper, Sept. 2014) (quoting a Bank of England Nov 1981 Aide Memoire – or guidance document – detailing a commercial bill policy which states effectively that services must be earned in accounting terms in order for a bill drawn to finance those services to be an “eligible bill”).

By contrast, in the American literature, the term “real bill” is often used interchangeably with the bills that were treated as eligible paper by the Federal Reserve Act of 1913, which is in fact a much broader category of bills. See, e.g., Lloyd Mints, *A History of Banking Theory* 9 (1945) (equating real bills to “commercial loans” or loans made for “short-term commercial purposes”).

⁴¹ Adam Smith, *Wealth of Nations* II.2.59 (1776); C.A.E. Goodhart, *The Changing Role of Central Banks*, 18 *Financial History Review* 135, 137 (2011). In support of the doctrine Sargent and Wallace use theoretic analysis to show that quantity restrictions on the money supply can generate interest-rate instability and result in an equilibrium that is bounded away from Pareto optimality, in environments where optimality is possible under a “real bills” approach. Thomas Sargent & Neil Wallace, *The Real Bills Doctrine versus the Quantity Theory: A Reconsideration*, 90 *J. Pol. Econ.* 1212, 1214, (1982).

⁴² David Laidler, *Misconceptions about the Real Bills Doctrine*, 92 *J. Pol. Econ.* 149, 151 (1984).

determine prices.⁴³ Indeed, it was because proponents of real bills recognized the danger of procyclical movements in money and prices that they sought to exclude from the money market instruments that financed the purchase and carry of capital market assets or land.⁴⁴ The destabilizing nature of such an asset-backed money supply had been illustrated by John Law's misadventures in 18th century France,⁴⁵ and every major British banking theorist recognized that an improperly backed money supply could foster asset price bubbles and offered trenchant criticism of Law's "debauch of paper money."⁴⁶ Thus, the traditional separation between money markets and capital markets in Britain was founded on an understanding of the dangers of using capital market assets as backing for the money supply.

In any case, the real bills doctrine, as stated above, quickly became irrelevant in England: by the 1830s the evolution of commercial practice and commercial law meant that finance bills had become so common that they were granted the same legal status as real bills.⁴⁷ Only a few years passed, however,

⁴³ Adam Smith (1776) at II.2.96 – 97; David Laidler, *Adam Smith as a Monetary Economist*, 14 Canadian J. Econ. 185, 197-98 (1981). Indeed, Friedman and Schwartz rather obliquely acknowledge Lloyd Mints' error in claiming that there was a contradiction in advocating both the real bills doctrine and the gold standard. A Monetary History of the United States 191 (1963) ("this contradiction is more apparent than real").

⁴⁴ See Adam Smith (1776) at II.2.64; Hugh Rockoff, *Adam Smith on Money, Banking, and the Price Level*, in Christopher J. Berry, Maria Pia Paganelli, & Craig Smith ed. *The Oxford Handbook of Adam Smith* 307, 317-18 (2013).

⁴⁵ For John Law's advocacy of a monetary system based on land, see John Law, *Money and Trade Considered with a Proposal for Supplying the Nation with Money* Ch. 7 (1705). John Law's experimentation with his theories in France resulted in the Mississippi Bubble. Adam Smith, *Lectures on Justice, Police, Revenue and Arms* 211-18 (1763).

⁴⁶ Ralph Hawtrey, *Currency and Credit* 235 (1919). See also Adam Smith (1763) at 211-18; Henry Thornton, *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain* 239, 341 (1802); Walter Bagehot, *Lombard Street* III.17 (1873). John Law's monetary exploits in France were considered so disreputable in Britain that Thornton mentions that in a debate in the House of Commons, one MP objected to any comparison between Law's bank and the Bank of England. Thornton, *supra*, at 341.

⁴⁷ The negotiability of a bill derived initially from the fact that it was the mechanism by which a commercial transaction was executed. James Rogers, *Early History of the Law of Bills and Notes* 97 (1995). Through the early years of the 19th century, the use of finance bills became common. *Id.* at Chapter 10. See also Henry Thornton, *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain* 88-89 (1802) (arguing that bankers are rightly more concerned with the creditworthiness of the endorser than with distinguishing real from finance bills). In the 1830s finance bills were given the same legal status as real bills: that is, in order to establish a legal case based on a bill that the defendant claimed was a finance bill, the petitioner was not required to prove that value had been given when the bill was created. Rogers, at 244. Thus, the great innovation of the English law of negotiable paper was that a bill became the physical embodiment of a debt so that a holder of a bill has rights independent of the original transaction that caused the bill to be created (or the absence of such a transaction). Rogers, at 94. This enabled the English system of bills to develop into "a perfectly flexible paper currency." M.D. Chalmers, *A Digest of the Law of Bills of Exchange* lvii (1896).

before two crises demonstrated the element of truth underlying the real bills doctrine: to avoid costly crises a financial system that relies on expansion of the money supply to fund business activity needs to guard against funding “zombie” firms and those with few prospects of success.⁴⁸

The real bills principle, then, defines two categories of finance bills that are considered speculative bills and are associated with banking crises: finance bills that the borrower has little prospect of paying off in the near future and that thus function as long-term or equity investment in the borrower’s business, and finance bills that are used to fund the purchase and carry of long-term assets.⁴⁹ In short, the real bills principle is distinguished from the real bills doctrine because it takes a permissive approach to the circulation of finance bills on the money market – as long as the borrower’s business is expected to generate the funds to pay off the finance bill within a relatively short time frame.

Because nothing in a finance bill’s appearance distinguished it from a real bill, implementation of the real bills principle was necessarily imprecise. As has already been noted, the Bank of England monitored its exposure not only to discounters and acceptors, but also to the various sectors of the economy, and thus the real bills principle was implemented by the Bank’s and the market’s response to any exceptional growth in the flow of credit – the sort of growth that could be generated by a “zombie” firm or industry gambling for redemption. Thus, the practice developed whereby bills that might be finance bills were carefully evaluated as they entered the market and the gatekeeper banks scrutinizing these bills would take into account recent trends in the quantity of finance paper on the market, and in the quantity of money market instruments financing both the issuer of the paper and the industry to which that issuer belonged.⁵⁰ Any bank or sector that drew too heavily on the market’s resources would “arouse suspicion” and find its ability to draw on the market curtailed.⁵¹

⁴⁸ The problem of zombie firms arose in the 1847 crisis, see King at 135-36, and of excessively loose underwriting practices in the 1858 crisis, Select Committee on the Bank Acts, Report, 1858, H.C. xiii-xiv (U.K.).

⁴⁹ Sayers (1976) at 277.

⁵⁰ Gillett Brothers Discount Co. Ltd., *The Bill on London* 47 (1952). Here, the term “gatekeeper bank” is used to refer to the discount houses that purchased accepted bills, and sold them on to money market investors.

⁵¹ Cross at 218; Sayers (1976) at 273-75.

From this perspective we see that the curtailment of credit to U.S. markets in 1906 was a reflection of the real bills principle-based view that any large and unusual increase in the quantity of bills issued by a particular sector of the economy was evidence of destabilizing speculation which the central bank was expected to staunch, long before changes in interest rates or asset prices would cause the flow to reverse. To emphasize the relationship to the modern discourse on central bank practice, observe that a policy based on the real bills principle (i) has countercyclical effects because of the speed with which it can be implemented and (ii) is both micro and macro prudential because both individual entities and their aggregates, sectors of the economy, are monitored.

In summary, the London money market was able to originate privately issued safe assets through a combination of carefully aligned incentives and real bills-based prudential regulation. Incentives at the micro-economic level were aligned, because the banks that originated and traded the assets could not sell off the credit risk of the asset and the managers had ownership stakes in the banks and bore extended liability for the banks' losses. Incentives at the macro-economic level were aligned inducing the banks to monitor each other due both to structurally-imposed interconnectedness and to the certainty that the banking system and not the government would bear the losses of even a "too-big-to-fail" bank. Micro-prudential regulation took the form of central bank monitoring of its exposure to assets discounted and originated by each bank and in most cases it was sufficient for the central bank to speak softly – while carrying a very big stick – to the bank in question whenever the credit flows raised concerns. Macro-prudential regulation took two forms: first, the segregation of money markets from capital markets which actualized the generally accepted principle that money market assets should not finance capital market or other long-term assets, and, second, central bank monitoring of money market credit extended to the different sectors of the economy and again speaking softly whenever those credit flows raise concerns.

In short, the stability of the British banking system was founded on a carefully calibrated financial structure that was able to originate privately issued assets that were equally as safe as government debt, and two important components of this safety were real bills-based macro-level constraints on credit

growth and the segregation of money markets from capital markets. Thus, when modern researchers find that credit during this period grew in concert with GDP, this empirical result should be viewed as an outcome of deliberate policy, not as an accident of history.

Rediscovering the incompatibility of money markets and capital markets

A few of the principles of pre-1914 British banking are being rediscovered by central bankers subsequent to the 2007-08 crisis. The fundamental distinctions between money markets and capital markets are discussed in a Bank of International Settlements paper, which explains that the money market and the capital market serve two very different purposes and are built on diametrically opposed logic: the money market can function well only in the presence of price stability – or an absence of price discovery – whereas capital markets function well when price discovery takes place.⁵²

An early 20th century central banker would agree with these distinctions, and explain further that the private sector's ability to create money market assets with stable prices must be carefully controlled so that money market expansion does not feed into capital markets and stimulate an asset price bubble. While the problem of asset price bubbles has become an important topic for modern researchers, the analysis of how the private sector can create safe money market assets has not.

Indeed at present the modern literature simply assumes that privately issued assets are intrinsically unsafe – and thus implicitly assumes that there is no way to structure markets so that privately issued assets are

⁵² Bengt Holmstrom, *Understanding the Role of Debt in the Financial System* 1-2 (BIS Working Paper No. 479, Jan. 2015) (discussing joint work with Tri Vi Dang and Gary Gorton). See also, Jaime Caruana, *Forward in Sovereign Risk: A World without Risk Free Assets* xxi-ii (BIS Papers No. 72, 2013) (discussing the dire implications for the financial system if sovereign debt loses its “safe asset” status). At least one recent evaluation of post-crisis research finds that Gorton and Holmstrom's work is path-breaking. David Warsh, *The Tardy Product*, Economic Principals Blog, May 17, 2015, <http://www.economicprincipals.com/issues/2015.05.17/1742.html> (The blog is the pre-publication of a book with the same title.)

Note that Holmstrom actually draws the distinction between the money market and the stock market. In my view he fails to recognize that in the modern world where significant portions of firm balance sheets are composed of secured debt, tradable long-term bonds are only a small step away from equity, and because they are unsecured should not necessarily be viewed as having a significant claim on firm assets. This is particularly true because firms typically find themselves obliged to take on increasing amounts of secured debt as they approach and enter bankruptcy.

as safe as government debt.⁵³ For example, a Federal Reserve study of “short-term safe instruments” assumes that “public securities are preferable to private ones” and goes on to compare commercial paper to Treasury bills.⁵⁴ Of course, from the point of view of pre-1914 British bankers, American commercial paper, on which only a single party is liable for payment, has never been structured to be safe. Indeed, the benefits that would accrue to the American financial system if it were to establish a “two-name” paper market were discussed extensively in the early 20th century.⁵⁵ From this point of view, the 2007-08 liquidity crisis that struck the shadow banking system in the U.S. – which treated commercial paper as if it were a safe asset⁵⁶ – was entirely predictable.

Commercial paper is easily compared to the bills that traded on the London money market, because the majority of the bills were, like commercial paper, unsecured instruments. In modern money markets, however, collateralized instruments play a much more important role than they did in early 20th century Britain: central banks typically provide liquidity using collateralized loans rather than by discounting bills, and repurchase agreements have become an important money market instrument.⁵⁷

In this environment modern researchers have difficulty imagining how a banking system built on unsecured credit can function. Thus, the current literature on privately issued safe assets starts with the assumption that it is impossible for private entities to borrow unsecured, and develops a theory of

⁵³ That is, the theoretic literature assumes that banks must allocate their funds between safe assets such as Treasury bills that pay a guaranteed return and private projects that always bear some risk of being worthless *ex post*. See e.g., Tri Vi Dang, Gary Gorton, Bengt Holmström & Guillermo Ordóñez, *Banks as Secret Keepers* 8, 27 (NBER Working Paper No. w20255, June 2014).

⁵⁴ Mark Carlson, Burcu Duygan-Bump, Fabio Natalucci, William R. Nelson, Marcelo Ochoa, Jeremy Stein, and Skander Van den Heuvel, *The Demand for Short-Term, Safe Assets and Financial Stability* 5-6 (Finance and Economics Discussion Series Working Paper No. 2014-102, Nov. 2014). Note also that Harold James has remarked that the 20th century transition to a U.S. dominated world economy included a transition “from a fundamentally London-based commercial based view” to one in which “government securities ... are the key to the international system.” Harold James, *Financial markets without a risk-free sovereign: Moderator’s introduction* in *Sovereign Risk: A World without Risk Free Assets* 63 (BIS Papers No. 72, 2013).

⁵⁵ See, e.g., Paul Warburg, *The Discount System in Europe*, Nat’l Monetary Comm’n Document No. 402 (1910); *Stabilization Hearing on H.R. 7895 Before the Committee on Banking and Currency, Part 1*, 69th Cong. 431 (1927) (testimony of Benjamin Strong, Governor, Federal Reserve Bank of New York).

⁵⁶ Carlson et al. (2014) at 3.

⁵⁷ Clemens Jobst & Stefano Ugolini, *The Coevolution of Money Markets and Monetary Policy, 1815-2008* 13 – 17 (ECB Working Paper No. 1756, Dec. 2014).

collateralized lending. This literature emphasizes the value of opacity – that is, the usefulness of collateral that is so costly to value that no one does so, making it possible for money market instruments backed by low-quality and high-quality assets to have the same price. In this framework, a crisis takes place when the fraction of high-to-low quality assets has declined to such an extent that costly price discovery is worthwhile.⁵⁸ The value of opacity in this literature, however, depends fundamentally on the inability of economic actors to borrow unsecured: If those with production opportunities can borrow unsecured, there is no economic benefit to offering alternative financing using opaque collateral.⁵⁹ Thus, I suspect that an early 20th century British banker on learning of the modern theory would find that the theory is a good description of a low-quality banking system, and would therefore ask: Why not put in place a high quality banking system by aligning incentives so that safe, unsecured, privately issued assets are originated?

As was noted above, another branch of the modern literature that has drawn the attention of central bankers studies the relationship between asset price bubbles and money market instruments that are collateralized by capital market assets.⁶⁰ A much-cited paper co-authored by a Federal Reserve Bank of New York official shows that when the amount that banks are willing to lend on a short-term basis is determined by the value of collateral, feedback loops develop that foster asset price bubbles and crashes.⁶¹

Once again a pre-1914 British central banker would find these results unexceptional. As R.S. Sayers explained the Bank of England when implementing its discount policy “regarded speculation – in commodities, or in the stock exchanges – as the most dangerous threats to the stability of the system.”⁶²

⁵⁸ Gary Gorton & Guillermo Ordonez, *Collateral Crises*, 104 Am. Econ. Rev. 343, 368 (2014).

⁵⁹ See, e.g., id. at 350. To be more precise the literature assumes away the possibility that repeated interactions and reputation can be used to support debt.

⁶⁰ That is, repurchase agreements.

⁶¹ Tobias Adrian & Hyun Song Shin, *Liquidity and Leverage*, 19 J. Fin. Intermediation 418 (2010). Note that the principles underlying this analysis have long been recognized. Lloyd Mints, A History of Banking Theory 30 (1945); Thomas Humphrey, *The Real Bills Doctrine*, Fed. Reserve Bank of Richmond Econ. Rev. 3 (Sept./Oct. 1982). Oddly enough, in the U.S. this phenomenon is associated with the “real bills doctrine” – presumably due to the confusion of the definition of eligible collateral under the Federal Reserve Act with real bills.

⁶² Sayers (1976) at 277. Note, however, that the Bank of England did not regulate all of a bank’s asset holdings and thus did permit a bank to lend against the collateral of capital market assets as long as the lending is done using instruments that do not trade on the money market. George Clare, A Money Market Primer 145 (1902). Similarly a

Indeed, our pre-1914 central banker would probably go on to explain that the best way to prevent the instability caused by asset price bubbles is to adopt a “real bills” based approach by separating money market liquidity, which depends on price stability, from capital market liquidity, where the goal is price flexibility.

This section addresses only two important results that have been rediscovered pursuant to the post-crisis research agenda. While a more thorough comparison of recent theoretical developments with the preceding section’s findings regarding the pre-1914 London money market would surely be of interest, that analysis is left for future work.

Lessons for modern policymakers

There are three lessons that modern policymakers should draw from this analysis of pre-1914 British banking theory: First, it is an error to assume that government debt is inherently safer than privately issued short-term unsecured debt, because the safety of the latter depends fundamentally on policy, including the incentives created by the structure of the money market, and the effectiveness of the central bank’s macro-prudential regulation of money market credit and its growth. Second, a crucial component of financial stability is the central bank’s macro-prudential exercise of control over the assets that circulate on the money market. Finally, the traditional separation of money markets from capital markets was an effective means of addressing one of the most important sources of financial instability, asset price bubbles.

Remarkably over the course of the 1980s and 1990s when policies were adopted in the U.S. that reversed the long-standing separation of money markets from capital markets, the concerns that were raised focused on the effects of the policy change on the banking system and there was virtually no

bank may accept capital market assets as collateral when, for example, a borrower has the capacity to pay, but lacks a credit history and is not eligible for an unsecured credit line. The key distinction in this case is that capacity is an important determinant of the credit extended.

consideration of the possibility that capital markets would be adversely affected by the change.⁶³ The idea that the integration of money and capital markets would be destabilizing, which seemed obvious to British bankers in the pre-1914 years, was beyond the scope of imagination a century later.

Many who have evaluated the consequences of this integration of money and capital markets have concluded that our current financial system is fundamentally unstable, and that only structural reform which eliminates the role played by banks in lending can address this instability.⁶⁴ These “narrow banking” proposals typically seek to separate banks’ role in the payments system from their lending activities, and to require that all bank deposits be backed by government debt or central bank reserves.

A few advocates of structural reform favor a “real bills” approach,⁶⁵ and, interestingly, narrow banking reforms have much in common with such proposals. Both approaches prohibit banks from lending on a long-term basis and from financing long-term assets, reflecting the view that capital market prices should be determined mostly by the transactions of real money investors. The significant difference in the two approaches is that the real bills view treats safe short-term bank loans – and in particular loans that make liquid assets that have been earned, but not yet realized – as an appropriate banking activity, whereas the narrow banking view would prevent banks from playing any role in expanding the money supply.

⁶³ A Supreme Court case explained the legislative purposes behind the Glass-Steagall Act of 1933 without mentioning capital markets, *Investment Co. Inst. v. Camp*, 401 U.S. 617 (1971), and it appears that others adopted this analysis. See, e.g., Jonathan Macey, *Special Interest Groups Legislation and the Judicial Function: The Dilemma of Glass-Steagall*, 33 Emory L.J. 1, 2, 13 (1984); Charles Calomiris, *The Costs of Rejecting Universal Banking: American Finance in the German Mirror, 1870-1914*, in *Coordination and Information: Historical Perspectives on the Organization of Enterprise* 272-73 (Naomi R. Lamoreaux and Daniel M.G. Raff ed., 1995). See also Arthur Wilmarth, *Did Universal Banks Play a Significant Role in the U.S. Economy's Boom-and-Bust Cycle of 1921-33? A Preliminary Assessment*, 4 Current Dev. In Monetary & Fin. L. 559, 585, 591 ff. (2005)

⁶⁴ Laurence Kotlikoff, *Jimmy Stewart is Dead: Ending the World's Ongoing Financial Plague with Limited Purpose Banking* (2010); Morgan Ricks, *A Regulatory Design for Monetary Stability*, 65 Vand. L. Rev. 1289 (2012); Adam Levitin, *Safe Banking* (SSRN working paper, Jan. 1, 2015); John H. Cochrane, *Toward a Run-Free Financial System*, in *Across the Great Divide: New Perspectives on the Financial Crisis* 197 (Martin Neil Bail & John Taylor ed., 2014); Martin Wolf, *The Shifts and the Shocks: What We've Learned – and Have Still to Learn – from the Financial Crisis* 234-35 (2014).

⁶⁵ To my knowledge the only scholars who share my view are Charles Goodhart & Enrico Perotti, *Maturity Mismatch Stretching: Banking has Taken a Wrong Turn*, CEPR Policy Insight No. 81, Mar. 2015 and Avner Offer, *Narrow Banking, Real Estate, and Financial Stability in the UK c. 1870-2010* in Nicholas Dimsdale & Anthony Hotson ed., *British Financial Crises since 1825* at 158 (2014).

Underlying this difference in approach is the skepticism that narrow banking proponents exhibit regarding the capacity of the banking system to originate any assets that are “safe.” The pre-1914 London money market demonstrates, however, that when the banking system is carefully structured to address incentive problems and when central bank macro-prudential policy is effective, the term safe, privately-issued asset is not an oxymoron. Evidence from the crises that took place over the course of the half-century that spanned the turn of the 20th century supports this view, because the real effects of these crises were relatively modest.⁶⁶ Furthermore, most scholars have concluded that there were no crises of any significance in Britain during this period.

This paper lays out in detail the four structural aspects of the London money market that supported the issue of private safe assets, few of which are present in modern money markets. First, the money market was structured as a discount market, so that every bank that originated or traded a money market asset was exposed to the credit risk of the asset until the asset was paid in full. This contrasts with the modern practice of originate-to-distribute which involves the sale and securitization of bank originated assets, which may then be funded on the money market. Second, both bank management and bank owners faced a measure of extended liability in the event that a bank failed and was unable to pay its debts. By contrast, in modern practice bank managers’ incentives are said to be properly aligned by the holding of shares in the bank when both they and the bank’s shareholders have (unextended) limited liability. Third, the assets that could be sold to the central bank at the discount facility were limited to assets that bore the guarantee of at least three entities, an issuer, the originating bank, and the discounting bank. Modern discount window practices are typically much looser, dispensing with the preference for non-financial issuers and the requirement that the asset be guaranteed by a second bank in addition to the discounting bank.⁶⁷

⁶⁶ See Schularick & Taylor, *supra*.

⁶⁷ While it is true that modern central bank liquidity is provided in the form of a collateralized loan and not a discount, the distinction between the two instruments should not be exaggerated. When the collateral underlying the loan is itself an unsecured loan, the transaction is in substance equivalent to the discount of a one-name bill. In both cases (i) an unsecured loan is transferred to the central bank, (ii) the borrowing bank receives the value of this unsecured loan from the central bank, and (iii) the borrowing bank guarantees that the full value received will be repaid to the central bank. Unsecured loans are eligible collateral at both the European Central Bank and Federal

Finally, the banking system had no expectation of access to government funds in the event of a bank failure, except that when the major banks were all willing to agree to a forbearance policy in order to prevent the forced liquidation of the failed bank's assets, the central bank could both broker the agreement and agree to abide by the forbearance policy on the same terms as the privately owned banks. Since the 2007-08 crisis – if not before⁶⁸ – the banking system has had reason to expect government support, although there is much debate over the effectiveness of post-crisis policies designed to reduce the likelihood of such support.⁶⁹

In short, based on the pre-1914 London money market we know how to structure a banking system that can originate safe, privately issued assets, and there is nothing remarkable about the formula for success. It is simply a matter of structuring the banking system so that incentives of the banks that originate and trade money market assets are all aligned together in favor of the circulation of assets with very low risk of default.

Such structural reforms address only the incentives created by banking, however, and are not sufficient to protect the banking system from the growth of new banks that underestimate risk, are initially very successful, and yet sure to fail in the long-run – potentially after having decimated the income and weakened the balance sheets of its more staid competitors. These well-recognized adverse effects of competition in financial markets are the reason that macro-prudential regulation by the central bank is also needed. Thus, financial stability and the private sector's ability to originate safe assets also depends fundamentally on the central bank's assiduous monitoring of both the banks that originate money market assets and the assets that they originate in order to ensure that innovation is not having the effect of distorting the price of risk. Typically when such distortions occur, there is a sudden and unusual flow of

Reserve Banks. Indeed, during the crisis the Federal Reserve accepted not only loans, but also significant quantities of equity shares as collateral – that is, it treated as collateral an asset that offered no promise to pay at all. See Primary Dealer Credit Facility data, available at http://www.federalreserve.gov/newsevents/reform_pdcf.htm.

⁶⁸ Gary Stern and Ron Feldman, *Too Big to Fail: The Hazards of Bank Bailouts* (2004).

⁶⁹ See, e.g., Barbara Rehm, *FDIC's own experts skeptical of resolution plan*, *American Banker*, Dec. 12, 2013; Gara Afonso and Joao Santos, *What do bond market think of too big to fail*, NY Fed's Liberty Street Economics Blog, July 1, 2015.

money market credit into the new asset. Thus, such credit flows call for central bank attention and analysis. If the evidence indicates that these credit flows are not economically justified, then the central bank must exercise control over the money market and restrain these flows. This is the model of macro-prudential regulation that the pre-1914 London money market offers us.

Pre-1914 British macro-prudential regulation also addressed the problem of feedback loops between growth in the money supply and growth in asset prices. When the Bank of England suspected that an unusual credit flow on the money market was due to asset-backed lending, it made sure that the flow of this credit on the money market was restricted.⁷⁰ In addition the long-standing separation of money markets from capital markets was designed to discourage procyclical interactions that would result in asset price bubbles.

This pre-1914 framework stands in stark contrast to our modern financial structure, where the repurchase agreement market institutionalizes the finance of capital market assets using money market instruments. This modern structure developed after Britain and the U.S. eliminated the regulatory framework that supported the separation of money and capital markets. Britain acted first with the 1986 Big Bang and the U.S. responded initially by reinterpreting the Glass-Steagall Act and finally in 1999 by repealing it. The repurchase agreement market grew up in this deregulatory environment and played a key role in the 2007-08 financial crisis⁷¹ – just as a British banker from 1900 would have predicted. The crisis, however, also saw the collapse of trade on the unsecured interbank markets that had been the fulcrum of British and

⁷⁰ Sayers (1976) at 277.

⁷¹ The broker dealers, including Bear Stearns and Lehman Brothers, were heavily reliant on repo funding. Zoltan Pozsar, Tobias Adrian, Adam Ashcraft, & Hayley Boesky, Shadow Banking, NYFRB Staff Rep. No. 458 at 35 (July 2010) (“DBDs [Diversified Broker Dealers] did not have securities arbitrage conduits and SIVs, but instead internal credit hedge funds, trading books and repo conduits. Partly due to this reason, DBDs’ intermediation process was more reliant on repo funding than that of FHCs’, which relied on a relatively even mix of CP, ABCP, MTNs as well as repos. Broker-dealers’ prominent reliance on repo was also due to their usage of their trading books (instead of conduits) to fund loan pools and structured credit assets and their securitization pipelines of ABS and ABS CDOs.”). As a result one of the first emergency lending facilities created by the Federal Reserve was the Primary Dealer Credit Facility, which was formed in March 2008 to backstop the repo market and then was expanded to accept unrated assets as collateral in September 2008. At the peak of the crisis \$156 billion was borrowed using this facility alone. Federal Reserve Board, Primary Dealer Credit Facility (PDCF), http://www.federalreserve.gov/newsevents/reform_pdcf.htm (viewed Dec. 17, 2015).

American banking through the 20th century.⁷² Thus, one result of the crisis has been to make the financial system more dependent than it has ever been in the past on a collateralized money market that is, as Adrian and Shin's recent research has shown, intrinsically unstable. The advice of a 100-year-old central banker would therefore be to find a way to rebuild a money market that is based on unsecured debt, because we know that it is possible for a reasonably stable financial system to be founded on the basis of a properly regulated unsecured money market, but we have little reason to believe that it is possible for a collateralized money market to furnish a similar foundation.

Conclusion

The one successful model of macroprudential regulation that we have indicates that before such regulation can be effective in stabilizing the modern financial system structural reform is necessary including the elimination of money market finance of long-term assets, and the restructuring of money markets to align incentives. It is after all far from clear that financial stability is a reasonable goal in a world where the banks originating and trading assets are not incentivized to originate and trade high-quality assets and where it is common for money market instruments to be backed by capital market assets. After structural reform, promoting financial stability will require monitoring the use of credit on the money market, treating the rapid growth of any asset class as evidence (that is subject to rebuttal) of the use of money markets for long-term finance, and restricting trade in such assets on the money market. Critics will undoubtedly claim that embracing such a strict financial regime would result in a dearth of credit. They are almost certainly wrong. At the turn of the 20th century Britain's carefully structured and monitored financial system was able to extend credit to markets around the world. Far from reducing the availability of credit, a well-structured financial system makes it possible for credit to be extended widely throughout not only the local, but even the world, economy.

⁷² William C. Dudley, Restoring Confidence in Reference Rates (speech), Oct. 2 2014, available at <https://www.newyorkfed.org/newsevents/speeches/2014/dud141002.html>.